

# Written PEMY Responses to AOC Section 2 and 3 Drafts Submitted for EPA Comment

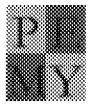
## Section 2 Tank Inspection, Repair, and Maintenance Report OUTLINE

### Overview

Section 2 of the AOC Statement of Work is critical for validity of content as well as for the communication of intent and actions to be taken by stakeholders to improve tank inspection, repair, and maintenance procedures. Therefore, the structure of the report, readability, and information presentation are important to achieve an organized and readable document. Although we have attempted to include some suggested changes to the outline that we reviewed, it is plain to us that the Section 2 report needs major revisions and possibly a total rewrite. The rewrite is needed so that it tells a story of what has happened, why it has happened, what lessons were learned, as well as how this information can and will be used to create a meaningful plan moving forward. As currently written, there is a voluminous regurgitation of data that is not connected in meaningful ways to the operating procedures at Red Hill. It is unacceptable in its current form. Making the suggested editorial changes is simply not going to solve an issue of such fundamental affect. We suggest that a conference call or meeting be scheduled to discuss the problems with the current report and get all parties aligned with report objectives before beginning the rewrite.

Significant difficulties include:

- Chapter 2, dedicated to describing the present TIRM procedures, instead summarizes the scope of work for Tank 5. Rather, it seems to us that the scope of work for Tank 5 should have followed the standard Facility procedures.
- Although there is a lessons learned section (Chapter 3) the current version is just a laundry list of facts, data, and issues. This section provides the rationale for what practices will be modified or changed and is therefore critical. We believe that rather than simply listing the problems that this section must include discussion of the content and provide rationale for why things are and should be done the way they are considering potential changes for improvement.
- The critical discussion on quality control and assurance of TIRM (Chapter 4) is just a listing that provides no basis for understanding the constraints that prevent good QA and how those constraints could be dealt with for improvement. For items that are important such as the development of a specification (4-4.3) there is no current content or ideas about how to do this effectively.



Most of the sections that are important next steps are left blank as to be filled in later. This makes a serious review of the document infeasible at this time.

### Report Structure

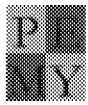
In Paragraph 1.2, the stated purpose is inconsistent with the AOC SOW. We suggest clarifying that the Section 2 TIRM report describes the current TIRM procedures and evaluates options for improvements to the current TIRM procedures. As discussed in subsequent comments, we believe that tightening the report focus on the current TIRM procedures, and deemphasizing or segregating the Tank 5 incident discussion, will aid decision makers and stakeholders in subsequent phases of the SoW.

Also in Paragraph 1.2, discussing the pros and cons of past, present, and emerging means and methods is overly broad. Past methods that have been eliminated are probably not important at all. Future methods might bear mention in the context of TIRM improvements (a subsequent part of the SoW) that have already been judged necessary and upon which work has already begun.

In Paragraph 2-1, consider improving the distinction between “current TIRM practices” and “TIRM practices used at Tank 5.” Aside from the lessons learned (Chapter 3) part of the Section 2 report, TIRM at Tank 5 is secondary to what the Navy/DLA consider to be current TIRM practices.

We believe that the bulk of content in Paragraphs 2-2, 2-3, and 2-4 should be reformulated as an Annex. The various NDE methods that TesTex employed on the Tank 5 project are not the same as the Navy/DLA current TIRM procedures. Descriptions of the NDE equipment, models, specifications, NDE procedures, qualifications and other miscellaneous information does not provide important information for stakeholder understanding or for decision making about improvements to current TIRM procedures. It is important reference information that pertains to the lessons learned aspect of the Section 2 report, but can be relegated to an annex. The section that covers NDE should list the types of NDE available for the various components of the tanks and, for each, discuss their strengths and weakness.

The intent of the current Paragraphs 2-2 and 2-3 would be fulfilled if this part of the Section 2 report could redirect focus on the current TIRM procedures for Inspection (Paragraph 2-2) and Repair (Paragraph 2-3). A brief list of the various NDT methods included in the current TIRM procedures should



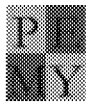
be followed by comparisons of the key attributes. For example, some techniques such as spot UT, vacuum box, visual inspections are entirely dependent on the NDE operator and leave no record of what was actually found. Other techniques have a data dump of technical output. There are places for each of these methods and often multiple methods are the optimal approach. Conclusions about the advantages and disadvantages of the available methods should be presented in a concise format. Moreover, the ideas about how these techniques are dependent on one another and must be used to supplement each other in varying degrees for optimal results should be presented.

Following the evaluation of available technologies, the report could discuss the rationale behind including these particular NDE methods in the current TIRM, followed by performance experience at Red Hill and how the future NDE methods can be selected based on past experience. Notes highlighting problems that can be expected would aid stakeholders and decision makers in subsequent stages of the SoW. This section would discuss the benefits of using redundant methodologies for the same structural component NDE and top level issues such as these.

Similarly, the narrative specific to the Tank 5 inspection in Paragraphs 2-5 and 2-6 can also be put into an Annex that describes the methods of repairs applied after the 2013-2014 leak. The chronology of repairs, sequences of events, what various contractors did in this section is also mostly distracting reference information that belongs in an Annex. Rather than put these details in this section, the salient points related to the current TIRM practices could be discussed with emphasis on how future tank inspections and repairs could be improved through recognition of lessons learned.

For example, these sections should discuss the advantages and disadvantages of LEFT and BEFT contrasted with more typical MFE, AUT, MT or PT. The discussion should include the rationale for selecting these technologies over other technologies and what criteria were used to make the final selections. Certainly, this kind of discussion will be needed moving forward and we suggest that all of the lessons learned be compiled in Chapter 3 – Lessons Learned..

Other critical aspects of these sections that warrant being in the main body are the discussion of access to the interior of the tanks. The historical narrative in Paragraph 2-7 is interesting, but the current outline appears to stop at just a statement of the historical practices and does not indicate that a re-examination will be completed in the Section 2 analysis. Plainly, the baskets are part of the current TIRM practices, but the Section 2 report should include analysis of this decision relative to the NDT methodologies and offer serious comparisons of the attributes of the central boom versus scaffolding.



Paragraph 2-8 appears to focus entirely on the equipment used by the NDT contractor on Tank 5, and does not offer insight into the verification methods required by the current TIRM practices. The process of calibrating and qualifying is likely common to most methods, but the report should focus on facility standards instead of an example of a past implementation.

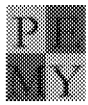
Paragraph 2-9 also focuses on past actions which, while influenced by the current TIRM procedures, do not completely describe how the facility decided on the current level of destructive testing. Further analysis in this paragraph relate to the discussion of whether or not destructive testing should have been used for previous inspection projects and, based on that analysis, whether or not it is advantageous to include destructive testing in future work. This part of Section 2 should be coordinated with the confidence in back-side corrosion rates being developed for Section 4.

Paragraph 2-10 also seems to use the past procedures at Tank 5 to define the current facility TIRM procedures. As an example, sub-paragraph b offers the narrative of a previously filed QC plan. Rather, it seems that the current TIRM probably should require that a QC plan be submitted, and there should be some minimum requirements for the QC plan. The process of defining those requirements, reviewing the submittal to assure adequacy, and overseeing their work to assure successful implementation would be an excellent topic for Paragraph 2-10.

Also in Paragraph 2-10, it seems appropriate to include some discussion of the limitations that DoD procurement rules impose on third-party QA, as well as facility staffing constraints, would be informative. Methods must be developed to minimize these negative impacts. The human factors issues span everything from ease of access to the tank wall for inspection, to inspection and testing of coatings, to the personnel coverage of these activities, the redundancy of these functions and so forth.

Paragraph 2-11 describes the coating inspections in Tank 5 but does not appear to include a description of the current TIRM practice for coating inspection. The conformance with that standard at Tank 5 certainly informs the lessons learned part of the report, but the purpose of this paragraph should be to describe the other inspections that the Facility requires as part of their TIRM and provides a summary of the rationale used to develop the list.

Paragraphs 2-13 through 2-16 are just a narrative of work that was completed. Of course, the work recently performed is a specific example of the TIRM procedures. Some of the actions at Tank 5 are no



longer part of the Red Hill procedures; the reasoning behind those changes is not important per se to a report describing the present TIRM procedures. What is important is the lessons learned.

### Chapter 3 LESSONS LEARNED FROM TANK 5 AND RELATED MODIFICATIONS TO CURRENT PROCEDURES

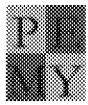
The content and organizational content of this section has been discussed in various parts of this review. We believe that this section should include two key elements of the overall work:

1. What the historical review of data, which is captured in an annex to this section, provides in terms of how the past work processes should be changed, why the past practices resulted in problems with a description of what the problems were, and what the limitations the government methodology and bureaucracy imposes on achievement of goals, and how these can be dealt with moving forward to reduce the chances of failure.
2. A compilation of all known leaks, problems and incidents (the nature of which was thoroughly discussed in the AoC face to face meetings last year) so that this data can not only be used to support this section but can be used for the future required risk assessments. This data should be compiled in one place and not scattered throughout the various sections of the various AoC sections.

The discussion of the lessons learned must be balanced and convincing. To illustrate a section that needs rework consider 3-5 Release was not attributable to corrosion related defects. Although it is an outline at this time, the contents of 3-5.1 and 3-5.2 are not convincing at all. Rather this work sounds defensive. It implies that corrosion is not a problem since the lesson learned was that some particular leak was not caused by corrosion. But this is not necessarily true for all past leaks. We know anecdotally that there were some corrosion holes associated with not only the leak detection systems but the shells themselves and that there were at least near through-wall corrosion pits. This section needs to be much more objectively dealt with and not sound as though the conclusion is reached before or without examining the records and the data available.

*In fact, the statement in 3-5.2 'Provide narrative that the API 653 inspection was sound, used the right equipment and personnel' shows that the author has already made up his or her mind already about the quality of inspections without going through the process that we need here, which is an unbiased and objective review of the evidence. We would call such as statement 'jumping to conclusions'. The document is filled with such pre-judged conclusions and we have significant concerns about how the report is being drafted with pre-made conclusions without the effort of due process.*

Chapter 4 does not have enough content to review. But what little there is shows that the key issues are not likely to be adequately addressed.



Chapter 5 should include a section on improving QA procedures to improve independent oversight of tank inspection and repair.

Paragraphs 5-2 and 5-3 should probably have an explicit commitment to improved QC (it's not mentioned in 5-3). They're mentioned in 4-4.3 and 4-4.4, but it seems that this report will be long and the appearances will be widely separated in the final TIRM report.

## Section 2 Recommendations

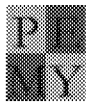
It is difficult to make recommendations at this time as so much of the report is in a pre-draft stage that it is difficult to even visualize the end product. What is clear now is that there is a plethora of data that is unsorted and is compiled into the report, but without organization and the ability to extract meaning from it. We believe that before a serious review can take place that a meeting of the minds is necessary and which would have to be accomplished through dialogue in the form of meetings and/or conference calls.

None the less, we have included come comments related to the material that is currently presented in the report to demonstrate some of the issues that we have concerns about:

1. Relocate all of the large amounts of data related to:
  - a. NDE
  - b. Historical events, staffing, etc.
  - c. Tank 5 repair details.

This is not to say that this information should be eliminated; rather, it should be treated as reference information and cited in the main report when appropriate and relevant. For example, the roster of companies involved with the Tank 5 project are likely not part of the current TIRM and could be relegated to an appendix.

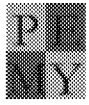
2. Include in the main body issues and discussions that are relevant to the current TIRM procedures. For example, in the NDE section discuss the rationale for selection of the NDE methods that are a part of the current TIRM procedures and if better or different methods should be investigated or used. State whether the current TIRM includes a rationally developed NDT procedure or if the choice of NDT methods is relegated to the QC subcontractor. This is the type of information needed to assess the effectiveness of the changes that were made, and need to be made, as the tank repair processes evolve.



3. Do not draw conclusions, then write the report to fit the conclusions as illustrated by the italicized text above. Rather, collect and interpret the data, then draw conclusion and/or recommendations.
4. Revise the lessons learned section to take much of the repeated and redundant data from other sections, especially, the historical data and compile in a meaningful way into the lessons learned section. Almost everything that is historical data related to tank 5 and the long lists of events can be put into an annex that supports the observations and conclusions about lessons learned. The information that clutters the report can then be used as reference information and be support for anything that we wish to have the stakeholders think about or act on. Enough discussion that is relevant to the key point about a lesson learned must be available to support the point so that it will be easy and clear for the decision teams moving forward with the preferred alternative to use the results of the lessons learned. We recommend creating a subsection or annex to the Lessons Learned section that compiles incident data related to the tanks, the leak detection systems and the problems experienced. This has been discussed before in the AOC meetings but we believe that outside challenges will best be answered by compiling this information as part of Section 2 TIRM and of Lessons Learned. These data will be the basis for the future risk assessments as well as to answer the questions about what incidents have actually transpired. It should include any of the incidents for which Board of Water supply is knowledgeable.
5. Provide a new section that discusses what work needs to be done to support a logical improvement to the current TIRM procedures. A few examples would be
  - a. Comprehensive NDE analysis and screening assessment and considerations for the selection of preferred methods. This section could discuss the NDE attributes such as recording of signals, ability to document and audit results, the speed of the process, the need for redundancy using other methods due to limitations, etc.
  - b. Thorough discussion of destructive testing including but not limited to pros and cons, the statistical value of destructive testing in terms of reducing or increasing the need to replace the liners, the need for data, etc. Consider that stakeholders and decision makers will want to coordinate this section of Section 2 with the Section 4 results.
  - c. Discussion of the scaffold and access issues that affect all of the work such as the welding, the NDE, quality assurance and other aspects of the project. During the AOC meetings there was discussion of consideration for a scaffolding system, but it is not discussed or mentioned in the current section.

## Section 2 Conclusions

Unfortunately, due to the current draft structure, organization and data, we are unable to give a serious review to the draft. It is not ready to be called a draft. A discussion on how the draft should be written, structured and approached maybe the next best step to achieving a draft within a reasonable time frame.



## Section 3

The document does a good job of scanning through options and screening out the obviously bad choices. What is missing is the statement that a much more detailed evaluation and assessment will be needed for the final 2 or 3 best candidates to be evaluated. It is something that will take cooperation between various technical experts and disciplines to fully evaluate.

Section 2.0 Existing Tank Construction/Configuration, we believe, should be descriptive only. We do not believe that it should “include some summary of past failure mechanisms sufficient to build on for the future”. As stated in the previous section, we believe that a new annex or section required that discusses both the historical incidents as well as the lessons learned should be captured as a separate discussion with the focus of course being on how future methods and auditing functions can help to avoid repeats from the past.

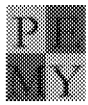
Section 2.3 again goes into historical issues. As stated previously it is best to have this in one place so that duplication and redundancy errors are minimized and the overall scope and concepts are as compact as possible.

In Table 4-1 Option 1D there should be a discussion of this option being dependent on the findings of destructive sampling findings removing a significant and representative sample of plates from an available tank such as T5.

The ranking system discussed in Table 5-1 is of concern. Here are some of the issues:

1. Although the word ‘constructible’ is acceptable for a screening exercise with very loose definitions, it should not be a criterion for the final selection of the preferred alternatives. Constructible for realistic and viable options is reflected by project cost estimates. Since costs are used separately for constructing benefit to cost assessments and for estimating the present worth of alternatives, the cost issues (i.e. constructability) should not be considered along with other attributes. All of the final options are constructible and they will all have different project costs. We suggest removing the ‘constructible’ attribute from the final evaluation criteria and simply compiling project costs separately. By including ‘constructible’ in the evaluation attributes we could be ‘double dipping’ and biasing the selection criteria with information that should be treated in isolation.
2. For the selection of the final preferred alternatives the word ‘testable’ does not work. There are many meanings to ‘testable’ depending on what is being considered. Tests are not only different depending on what kind of construction, operation, or problem is being examined but may





involve redundancy of testing. We suggest eliminating discussion of 'testable' altogether in the final analyses of the preferred alternatives. 'Testable' like 'constructible' is a screening aid only.

3. The screening criterion 'inspectable' also has many attributes and contexts and no such simple scoring of an alternative will assign an overall capability of inspection to determine problems with the structure by itself. We recommend deleting this term from the final selection analysis of the preferred alternatives.

This discussion brings home the point that the current section is only a rough screening to create a manageable list of viable alternatives. Since this has been accomplished it is time to consider the details of how a much more careful analysis of the overall pros and cons of the best alternative can be created. We believe that since there is consensus on the screening tools, the next step will be the selection of the preferred alternative. We believe that formal decision analysis will be required for this.

There are numerous decision making processes that may be used:

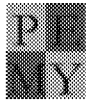
- Intuitive
- Payoff matrices
- Satisficing
- Kepner-Trego
- Analytic hierarchy process
- Multiattribute utility

These methods may be improved using sensitivity analysis. In any case, these types of methods require knowledge of decision analytic methodologies and usually require formal facilitation.

We believe that the consultants should begin now to formulate the decision making processes that make the most sense for this project. Decision making alternatives should be proposed so that the stakeholders may select a process or a combination of processes to move forward with selection of the preferred alternative.

### Summary Section 3 Recommendations

1. Remove all discussion and references to past incidents and lessons learned. These should be aggregated with those of Section 2 and compiled into a separate annex or document. The Lessons Learned Annex will serve not only to compile all known lessons that we wish to incorporate into the final design and engineering of the selected alternative, but can assist in the risk assessment section and in defending the selection process from challenges by outside parties.



2. Eliminate the ranking system proposed since it is not really quantitative. At least ensure that it is not stated to be quantitative.
3. Create a new section that discusses how the preferred alternatives (i.e. those that have survived the screening process) will be analyzed. Discuss which decision analytic methods will be used and why. Discuss the decision making process in the context of the stakeholder needs.

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